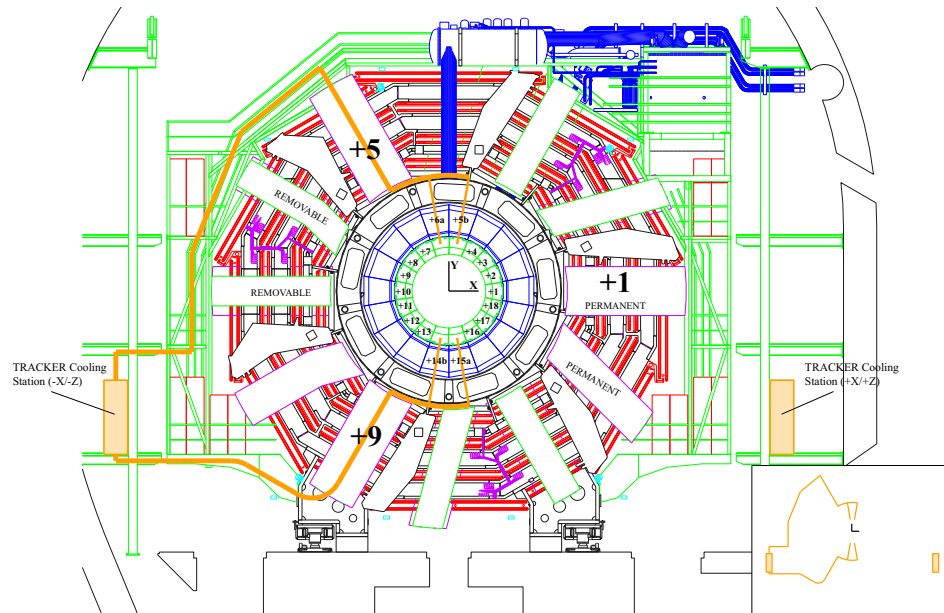


# Pixel Coolant Paths

*to reduce pressure on detector: inlet via top, outlet via bottom*

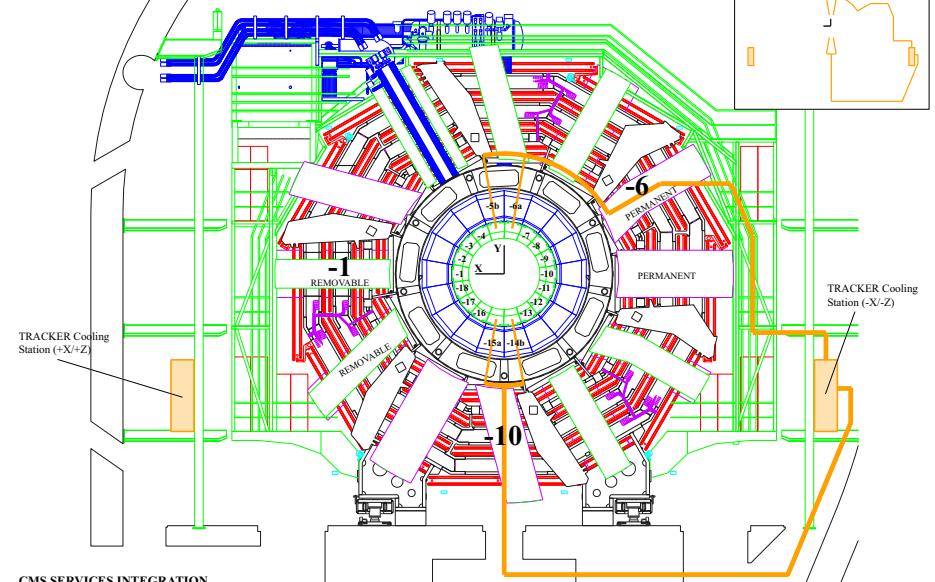
**+ Z**

TK Pixel & Th. Screen CABLING & COOLING  
YB/0 Central Wheel Z(+) Face



**- Z**

TK Pixel & Th. Screen CABLING & COOLING  
YB/0 Central Wheel Z(-) Face



CMS SERVICES INTEGRATION  
TK Pixel & Th. Screen CABLING & COOLING - 30 MAY 2001  
S.BALLY, ETH-Z@CERN-EP/CM

**Left half barrel + z → - z: 92.5 m**

**Right half barrel - z → + z: 80.5 m**

**Disks at + z: 84.3 m**

**Disks at - z: 87.5 m**

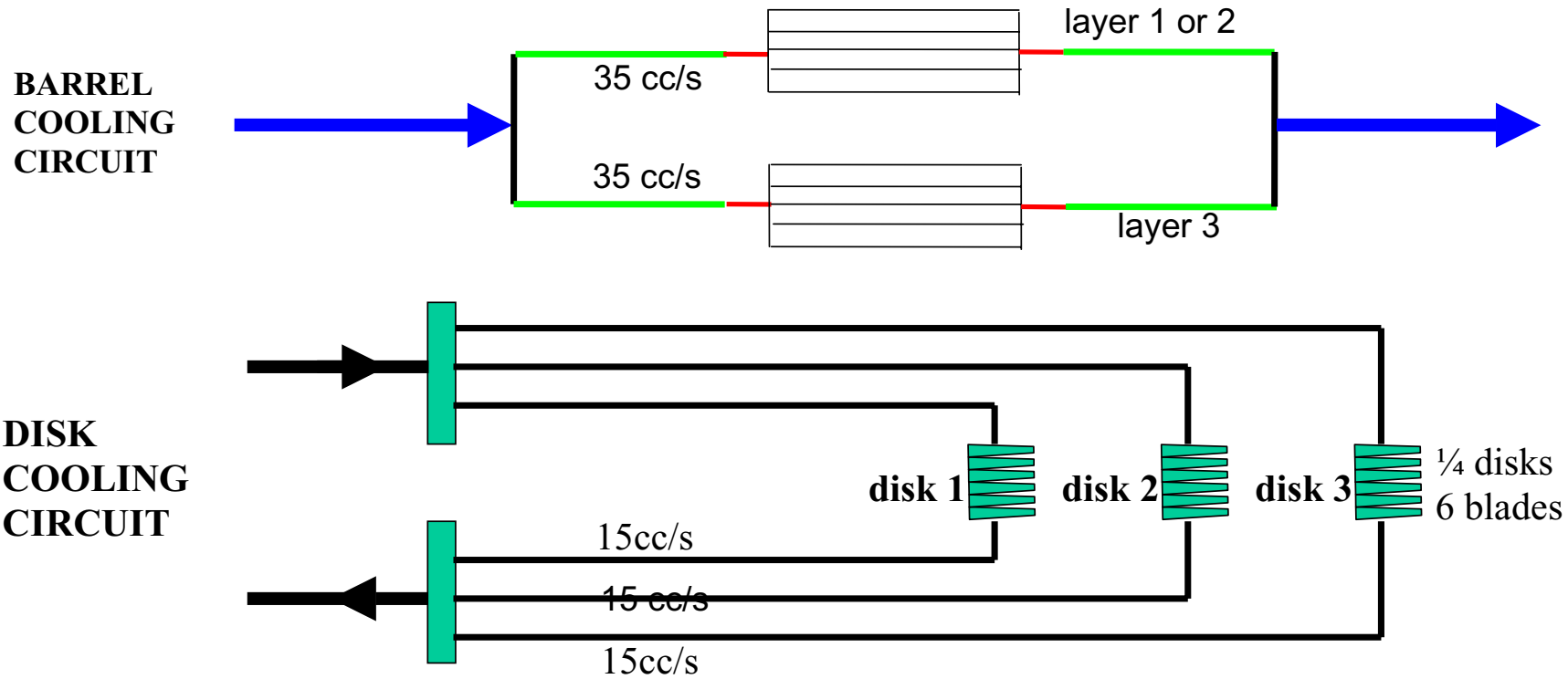
**5 circuits**

**5 circuits**

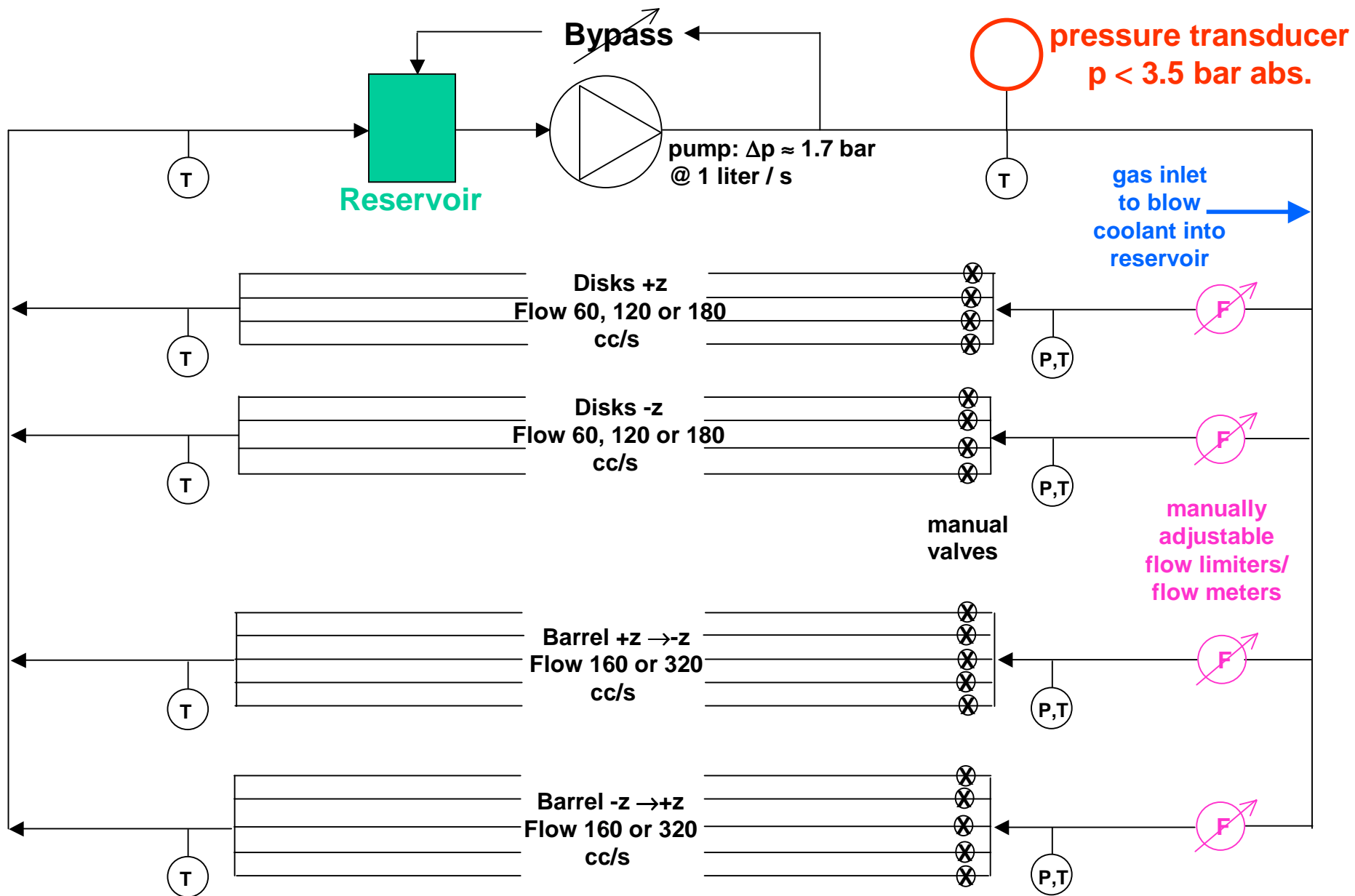
**4 circuits**

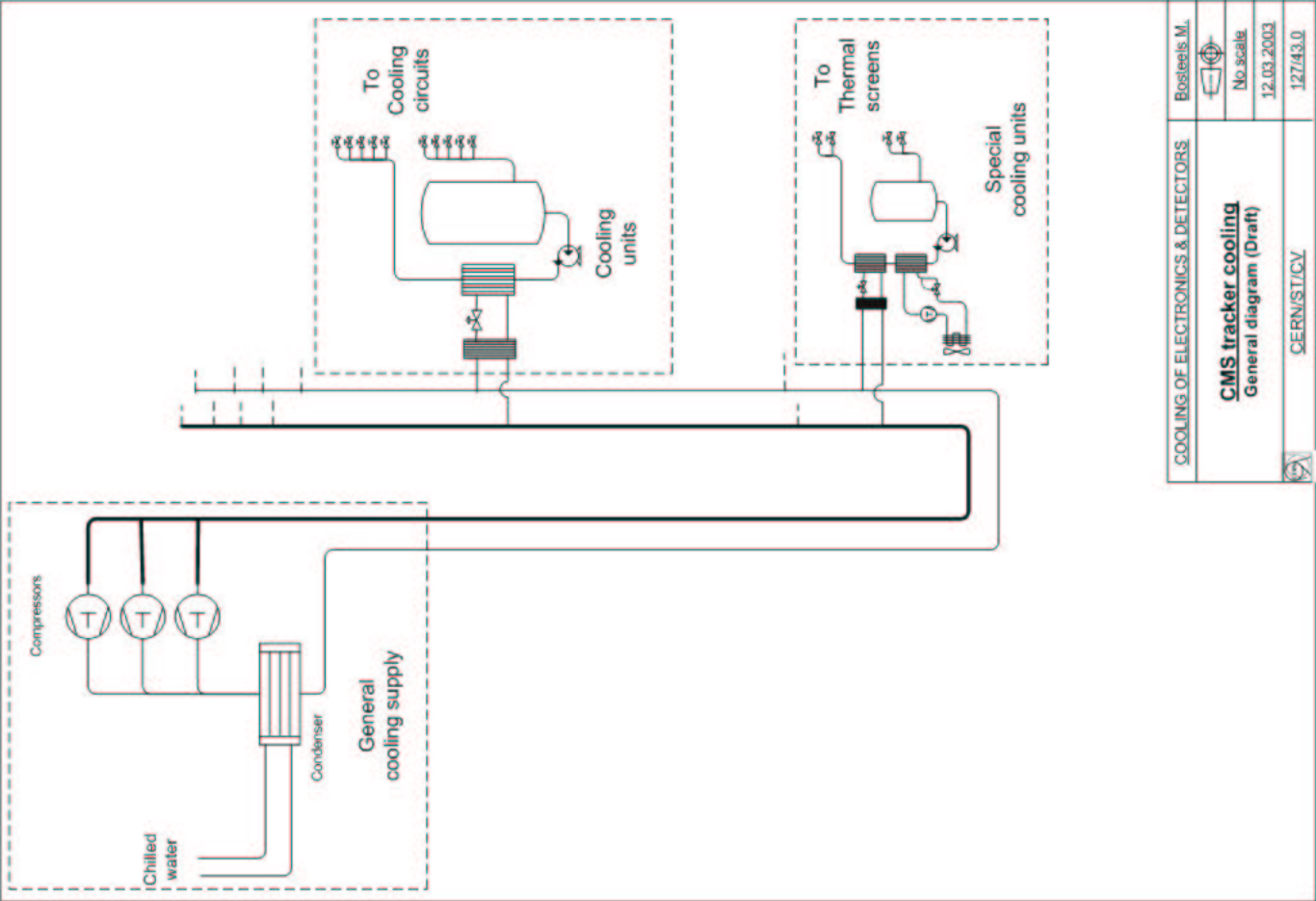
**4 circuits**

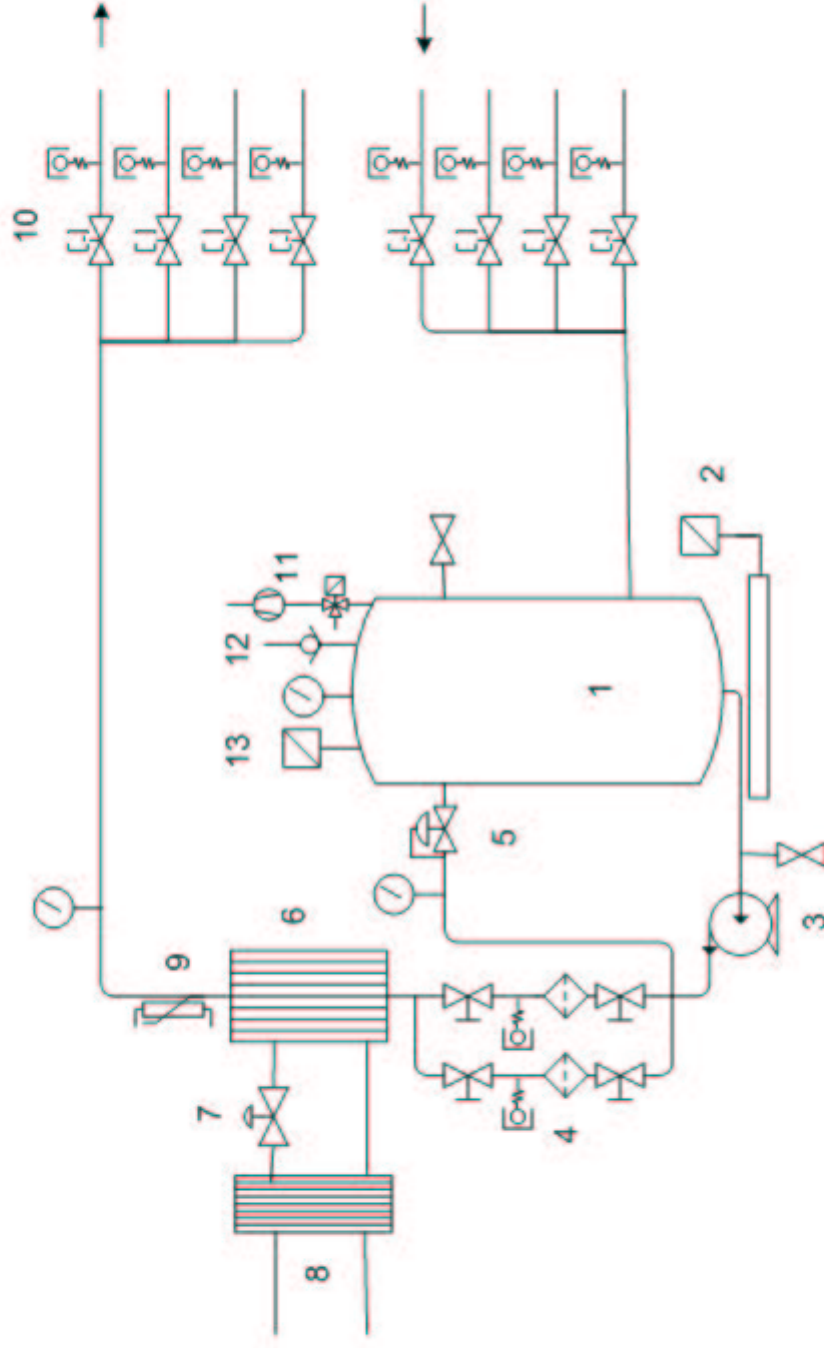
# Pressure drops for staged pixel



Pixel detector configuration	Number of circuits in operation	Nominal flow per circuit [cc/sec]	Total pressure Drop [bar]	Pressure drop in supply/return line [bar]	Pressure drop in or [bar]
Barrel layers 1+2	10	35	1.00	2×0.15	0.70
Barrel layers 1+2+3	10	70	1.70	2×0.50	0.70
2×1 Disk	8	15	1.35	2×0.05	1.25
2×2 Disks	8	30	1.55	2×0.15	1.25
2×3 Disks	8	45	1.75	2×0.25	1.25







COOLING OF ELECTRONICS & DETECTORS

Bostee's M.

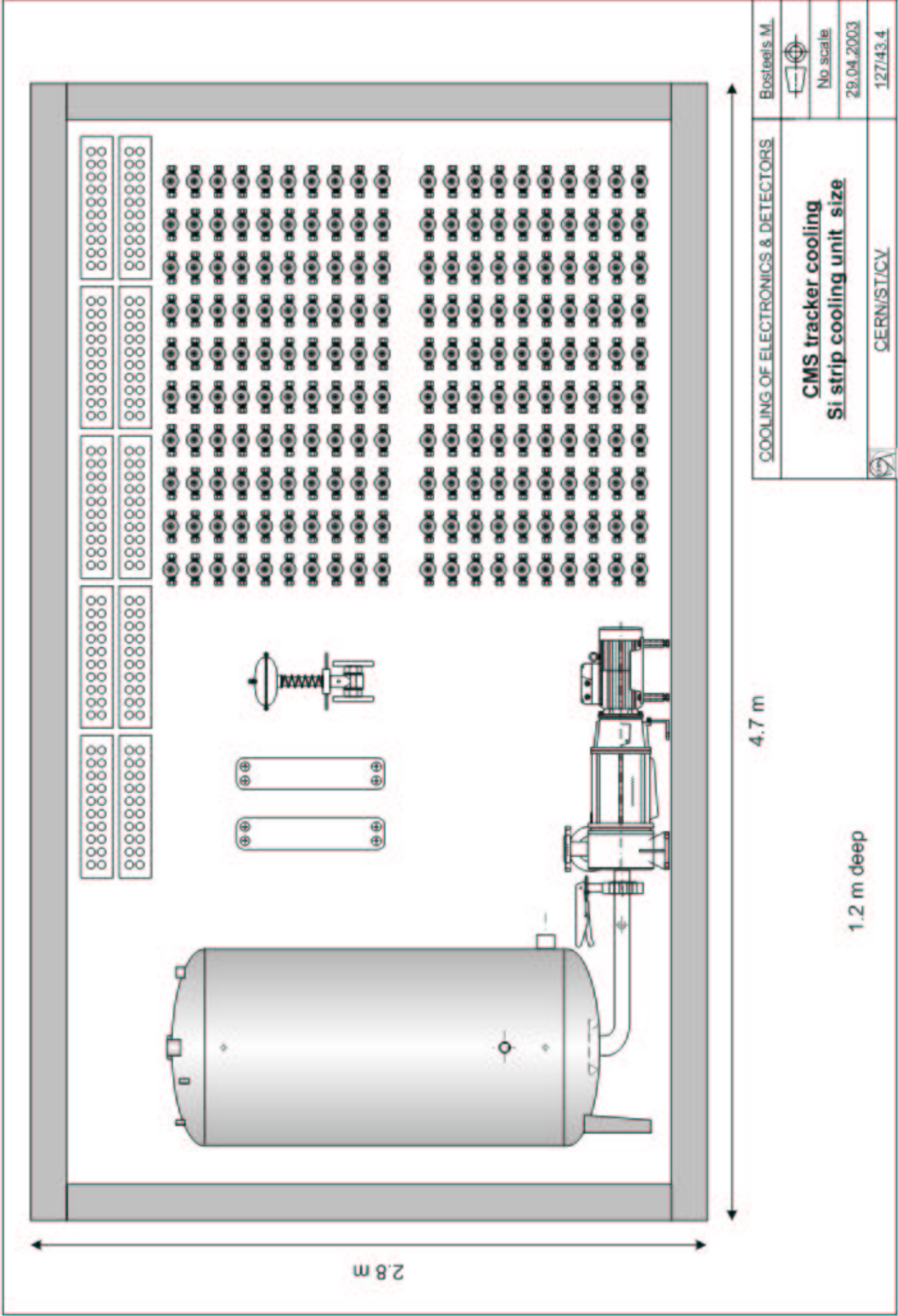
**CMS tracker cooling**  
Single cooling unit diagram (Draft)

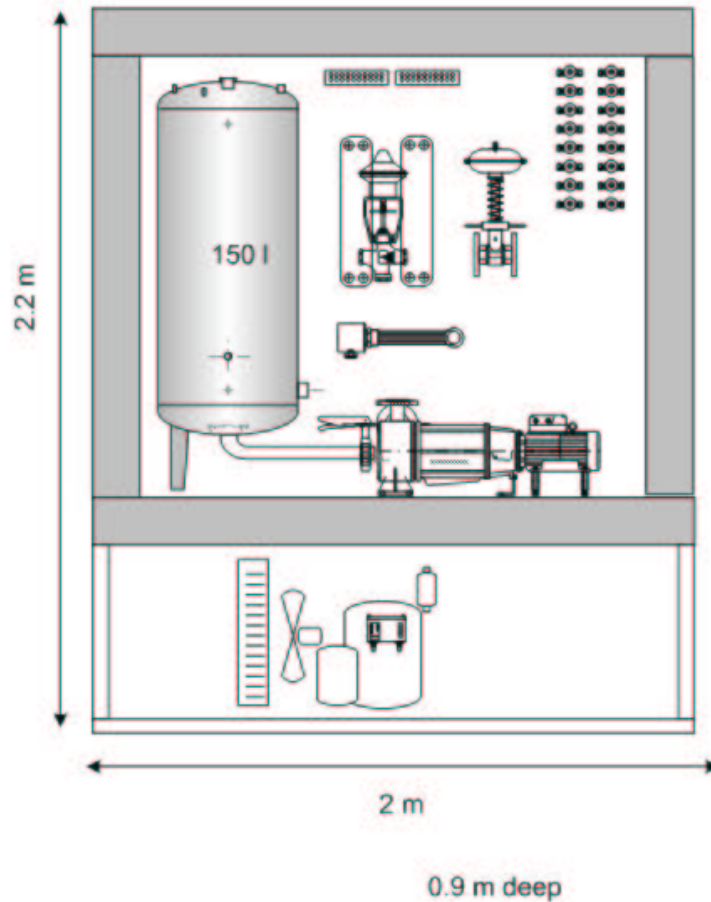
No scale

07.04.2003



CERN/ST/CV

127/43.2





Should we have a similar cooling rack for pixel?

COOLING OF ELECTRONICS & DETECTORS	Bosteels M.
<b>CMS tracker cooling</b>	
<b>Thermal screens cooling unit size</b>	No scale
	29.04.2003
 CERN/ST/CV	127/43.6

## **Discussion on private cooling rack for pixel**

### **Special cooling parameters for pixel:**

- higher operating temperature (heat/cool liquid with 20kW for  $\Delta T = 10^\circ$  ?)
- lower operating pressure (pressure reducer?)
- staged pixel requires different flow rates

### **Special maintenance due to annual interventions could disturb SiTracker:**

- possibility of mis-manipulation
- empty/refill pixel cooling circuits. Introduction of contaminants? Leaks?
- for warm-up and cool-down want free choice of temperature profile
- danger of icing cooling rack

### **Special safety measures for pixel:**

- would like to have flow meter in each outlet of the 18 circuits (affordable for pixel, not for SiTracker?)



